

Attorney Docket No. INK-002

PATENT APPLICATION

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

AUG 28 2006

Applicant(s): In Kwon Jeong

Group Art Unit: 3723

Serial No. 10/829,593

Confirmation No. 6718

Filed: April 21, 2004

Examiner: Rachuba, Maurina T.

For: APPARATUS AND METHOD FOR POLISHING SEMICONDUCTOR WAFERS
USING ONE OR MORE POLISHING SURFACES

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on June 29, 2006.

The fee for filing this Appeal Brief is (37 CFR 41.20(b)(2)) \$500.00. The applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: \$250.00.

Please charge \$250.00 to Deposit Account No. 503444. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 503444 pursuant to 37 CFR 1.25. A duplicate copy of this transmittal letter is enclosed.

Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Date: August 28, 2006

Respectfully submitted,

By: Thomas H. Ham
Thomas H. Ham
Registration No. 43,654

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. 1.8

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being facsimile transmitted to the Patent and Trademark Office facsimile number (571) 273-8300 on August 28, 2006.

Number of Pages: 43 (including TRANSMITTAL LETTER)Signed: Thomas H. Ham

Typed Name: Thomas H. Ham

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BRIEF ON APPEAL

Sir/Madam:

This brief is in furtherance of Applicant's Notice of Appeal filed on June 29, 2006, appealing the decision of the Examiner dated March 31, 2006 finally rejecting claims 1-6 and 10-23.

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. 1.8

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Number of Pages: 43 (including TRANSMITTAL LETTER)

Signed: 

Typed Name: Thomas H. Ham

I. Real Party in Interest

The real party in interest in this appeal is INOPLA Inc., a California Corporation, having a place of business at 1930 Junction Avenue, San Jose,
5 California 95131.

II. Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress
10 that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

III. Status of Claims

15 Claims 1-113 were originally filed with the application on April 21, 2004. In response to a restriction/election requirement of March 11, 2005, claims 1-6 and 10-23 were elected. Consequently, claims 7-9 and 24-113 were withdrawn from consideration. No claims have been amended, canceled, or added in response to any Office Action. Furthermore, no claims have been amended, canceled, or added for
20 purposes of this Appeal.

Claims 1-6 and 10-23 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 5,908,347 ("Nakajima et al.") in view of U.S. Patent No. 6,346,038 B1 ("Kajiwarra et al.").

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This Appeal is made with regard to pending claims 1-6 and 10-23.

IV. Status of Amendments

30 No amendments were filed subsequent to final rejection.

V. Summary of Claimed Subject Matter

The claimed invention is an apparatus for polishing objects, such as semiconductor wafers, utilizing one or more polishing surfaces, multiple wafer carriers and at least one load-and-unload cup (See lines 15-17 in paragraph [0006] on page 2 of the specification). According to an embodiment of the invention, as recited in claim 1, an apparatus for polishing objects comprises a first object carrier (262a), a second object carrier (262b), a first object relay device (280b) and a second object relay device (280a or 280c), as shown in Fig. 1. The first object carrier (262a) is positioned over a first polishing surface (255a). The second object carrier (262b) is positioned over a second polishing surface (255b). The first object relay device (280b) is positioned between the first object carrier (262a) and the second object carrier (262b). The first object relay device (280b) includes a first load-and-unload cup (282b) and a first pivoting drive mechanism (286b), as shown in Fig. 2. The first pivoting drive mechanism (286b) is configured to pivot the first load-and-unload cup (282b) to and from the first object carrier (262a) and the second object carrier (262b) about a first pivoting axis to transfer the objects from the first object carrier to the second object carrier. The second object relay device (280a or 280c) is positioned adjacent to one of the first object carrier (262a) and the second object carrier (262b). The second object relay device (280a or 280c) includes a second load-and-unload cup (282a or 282c) and a second pivoting drive mechanism (286). The second pivoting mechanism (286) is configured to pivot the second load-and-unload cup (282a or 282c) to and from one of the first object carrier (262a) and the second object carrier (262b) about a second pivoting axis to transfer the objects to the first object carrier (262a) or from the second object carrier (262b).

According to another embodiment of the invention, as recited in claim 10, an apparatus for polishing objects comprises a plurality of object carriers (262a, 262b and 262c) and a plurality of object relay devices (280a, 280b, 280c and 280d), as shown in Fig. 1. The plurality of object carriers (262a, 262b and 262c) is positioned over a plurality of polishing surfaces (255a, 255b and 255c). The plurality of object

relay devices (280a, 280b, 280c and 280d) is positioned between the object carriers (262a, 262b and 262c) such that at least one object relay device is positioned between two adjacent object carriers. Each object relay device includes a load-and-unload cup (282) and a pivoting drive mechanism (286). The pivoting drive mechanism (286) is configured to pivot the load-and-unload cup (282) to and from the two adjacent object carriers about a pivoting axis to transfer the objects between the two adjacent object carriers.

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1-6 and 10-23 are unpatentable over Nakajima et al. in view of Kajiware et al.

VII. Argument

A. Rejection of Independent Claims 1 and 10 Under 35 U.S.C. §103(a)

In the Final Office Action of March 31, 2006, the Examiner rejected the independent claims 1 and 10 under 35 U.S.C. §103(a) as allegedly being unpatentable over Nakajima et al. in view of Kajiware et al. However, the Examiner failed to establish a *prima facie* case of obviousness for these independent claims 1 and 10. Thus, the independent claims 1 and 10 cannot be rendered obvious in view of the cited references of Nakajima et al. and Kajiware et al.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both

he found in the prior art, and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The cited reference of Nakajima et al. discloses a polishing system that includes four polishing units 50 and three transferring units 60 (see Figs. 1 and 3). Each polishing unit 50 includes a polishing plate 52 on which four carrying plates 12 can be set (column 5, lines 32-36). Four wafers 11, whose diameter is 8 inches, or five wafers 11, whose diameter is 6 inches, are mounted on each carrying plate 12 (column 4, lines 8-11). The transferring units 60 are respectively provided between the adjacent polishing units 50 (column 6, lines 13-14). Each transferring unit 60 transfers the carrying plate 12, which is located at a discharging position of the polishing plate 52 of the polishing unit 50 located on an upstream side, to a feeding position of the polishing plate 52 of the polishing unit 50 located on a downstream side (column 6, lines 14-19).

15

On page 4 of an Office Action mailed on September 29, 2005, the Examiner states that the cited reference of Nakajima et al. "does not explicitly disclose that the object carriers use load-and-unload cups to transport objects." Applicant assumes that the Examiner means that Nakajima et al. does not explicitly disclose that the object relay devices, i.e., the transferring units 60, use load-and-unload cups to transport objects. However, the Examiner then states that Kajiwara et al. "teaches the use of load-and-unload cups to transport objects between storage and a polishing device, and back to storage." The Examiner then asserts that "[i]t would have been obvious to one of ordinary skill to have provided '347 [Nakajima et al.] with the load-and-unload cups taught by '038 [Kajiwara et al.], column 2, lines 40-48, to provide a wafer loading/unloading device which is capable of performing positioning and mounting easily and in a stable manner when attaching the wafer to the polishing head and which can receive the polished wafer in a stable manner and pass it to the next step." Applicant respectfully disagrees with this analysis.

30

As mentioned above, the transferring units 60 of Nakajima et al. are used to transport carrying plates 12. Each carrying plate 12 can carry four or five wafers 11, which are mounted thereon. However, the cited reference of Kajiwara et al. discloses a wafer loading/unloading device that is used to transport individual wafers. The wafer loading/unloading device of Kajiwara et al. includes a loading device 1 (see Fig. 1) and an unloading device 101 (see Fig. 6). The loading device 1 includes a loading portion 2, which is used to receive a wafer from a wafer conveying mechanism (column 10, lines 19-29) and to attach the wafer onto a polishing head (column 10, line 62, to column 11, line 5). The unloading device 101 includes an unloading portion 102, which is used to receive a wafer from a polishing head (column 12, lines 5-17) and to pass the wafer to a robot arm 140 (column 12, lines 18-24).

As described above, the wafer loading/unloading device of Kajiwara et al. is used to transport individual wafers, while the transferring units 60 of Nakajima et al. are used to transport carrying plates 12. The wafer loading/unloading device of Kajiwara et al. is not designed to transport the carrying plates 12. Therefore, if the wafer loading/unloading device of Kajiwara et al. is substituted for the transferring units 60 in the polishing system of Nakajima et al., as suggested by the Examiner, the resulting polishing system will not function properly because the wafer loading/unloading device of Kajiwara et al. would not be able to transport the carrying plates 12 between the polishing units 50. Thus, there is no suggestion or motivation to modify the polishing system of Nakajima et al. using the teachings of Kajiwara et al. as proposed by the Examiner. Consequently, the Examiner has failed to establish a *prima facie* case of obviousness for the independent claims 1 and 10.

In the Advisory Action mailed on June 8, 2006, the Examiner argues "that there is no evidence, other than the design of the plates, that the overall device will not function if only one wafer is processed at a time." The Examiner further states that "[i]n other words, the polishing system does not depend on how many wafers are

attached to the carrying plate.” Applicant agrees that the issue is not how many wafers are attached to the carrying plate. Regardless of the number of wafers attached to the carrying plate, the most significant fact is that the polishing system of Nakajima et al. is designed to transport the carrying plate. However, the wafer loading/unloading device of Kajiwara et al. is designed to transport individual wafers, not carrying plates. Thus, the wafer loading/unloading device of Kajiwara et al. cannot be used in the polishing system of Nakajima et al. in the manner suggested by the Examiner. As such, the independent claims 1 and 10 are not obvious over Nakajima et al. in view of Kajiwara et al.

10

B. Rejection of Dependent Claims 2-6 and 11-23 Under 35 U.S.C. §103(a)

The dependent claims 2-6 and 11-23 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Nakajima et al. in view of Kajiwara et al. However, the Examiner has also failed to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a) for these dependent claims 2-6 and 11-23. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Each of the dependent claims 2-6 and 11-23 depends on one of the independent claims 1 and 10. As such, these dependent claims include all the limitations of their respective base claims. Therefore, the Examiner has failed to establish a *prima facie* case of obviousness for these dependent claims 6 and 11-23

for at least the same reasons as their respective base claims, as well as the reasons set forth below.

SUMMARY

5

The Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a) for the independent claims 1 and 10, as well as the dependent claims 2-6 and 11-23. In particular, Examiner has not provided a valid suggestion or motivation to modify the polishing system of Nakajima et al. using the wafer loading/unloading device of Kajiware et al. since the wafer loading/unloading device of Kajiware et al. cannot be used to transport carrying plates between the polishing unit of the polishing system of Nakajima et al., as suggested by the Examiner. Therefore, claims 1-6 and 10-23 cannot be rendered obvious in view of the cited reference of Nakajima et al. and Kajiware et al.

15

For all the foregoing reasons, it is earnestly and respectfully requested that the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1-6 and 10-23, so that this case may be allowed and pass to issue in a timely manner.

20

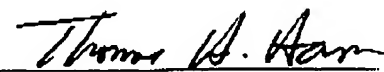
Respectfully submitted,

In Kwon Jeong

25

Date: August 28, 2006

By:



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VIII. Claims Appendix

1 1. An apparatus for polishing objects, said apparatus comprising:
2 a first object carrier positioned over a first polishing surface;
3 a second object carrier positioned over a second polishing surface;
4 a first object relay device positioned between said first and second
5 object carriers, said first object relay device including a first load-and-unload cup and
6 a first pivoting drive mechanism, said first pivoting drive mechanism being
7 configured to pivot said first load-and-unload cup to and from said first and second
8 object carriers about a first pivoting axis to transfer said objects from said first object
9 carrier to said second object carrier; and
10 a second object relay device positioned adjacent to one of said first and
11 second object carriers, said second object relay device including a second load-and-
12 unload cup and a second pivoting drive mechanism, said second pivoting mechanism
13 being configured to pivot said second load-and-unload cup to and from one of said
14 first and second object carriers about a second pivoting axis to transfer said objects to
15 said first object carrier or from said second object carrier.

1 2. The apparatus of claim 1 wherein said first and second object carriers are
2 arranged in a first linear manner, and parking positions of said first and second load-
3 and-unload cups of said first and second object relay devices are arranged in a second
4 linear manner such that said first and second object carriers are positioned to be

5 substantially parallel to said first and second load-and-unload cups positioned at said
6 parking positions.

1 3. The apparatus of claim 2 wherein the distance between said first and
2 second object carriers is substantially equivalent to the distance between said parking
3 positions.

1 4. The apparatus of claim 1 further comprising an object cleaner configured
2 to clean said objects, said object cleaner being positioned such that a longer side of
3 said object cleaner is adjacent to a longer side of an area defined by said first and
4 second polishing surfaces.

1 5. The apparatus of claim 1 further comprising a first object transport device
2 to transfer said objects to said first object carrier or said second load-and-unload cup
3 of said second object relay device, and a second object transport device to transfer
4 said objects from said second object carrier or from said second load-and-unload cup.

1 6. The apparatus of claim 1 wherein said second object relay device is
2 positioned adjacent to said first object carrier such that said first object carrier is
3 positioned between said first and second object relay devices, and further comprising
4 a third object relay device positioned adjacent to said second object carrier such that
5 said second object carrier is positioned between said first object relay device and said
6 third object relay device, said third object relay device including a third load-and-

7 unload cup and a third pivoting drive mechanism, said third pivoting mechanism
8 being configured to pivot said third load-and-unload cup to and from said second
9 object carrier about a third pivoting axis to transfer said objects from said second
10 object carrier.

1 7. A method for polishing objects, said method comprising:
2 transferring an object to a first object carrier positioned over a first
3 polishing surface;
4 polishing said object on said first polishing surface using said first
5 object carrier;
6 transferring said object from said first object carrier to a second object
7 carrier positioned over a second polishing surface using a first load-and-unload cup,
8 including pivoting said load-and-unload cup about a pivoting axis;
9 polishing said object on said second polishing surface using said
10 second object carrier; and
11 transferring said object to a second load-and-unload cup positioned
12 adjacent to one of said first and second object carriers to load said object onto said
13 first object carrier or unload said object from said second object carrier.

1 8. The method of claim 7 further comprising transferring said object to said
2 first object carrier or said second load-and-unload cup, and transferring said object
3 from said second load-and-unload cup or from said second object carrier.

1 9. The method of claim 7 further comprising transferring said object from
2 said second object carrier to a third load-and-unload cup positioned adjacent to said
3 second object carrier.

1 10. An apparatus for polishing objects, said apparatus comprising:
2 a plurality of object carriers positioned over a plurality of polishing
3 surfaces; and
4 a plurality of object relay devices positioned between said object
5 carriers such that at least one object relay device is positioned between two adjacent
6 object carriers, each object relay device including a load-and-unload cup and a
7 pivoting drive mechanism, said pivoting drive mechanism being configured to pivot
8 said load-and-unload cup to and from said two adjacent object carriers about a
9 pivoting axis to transfer said objects between said two adjacent object carriers.

1 11. The apparatus of claim 10 wherein said object carriers are arranged in a
2 linear manner.

1 12. The apparatus of claim 11 wherein parking positions of load-and-unload
2 cups of said object relay devices are further arranged in a linear manner such that said
3 object carriers are positioned to be substantially parallel to said load-and-unload cups
4 positioned at said parking positions.

1 13. The apparatus of claim 12 wherein the distance between adjacent object
2 carriers of said object carriers is substantially equivalent to the distance between
3 adjacent parking positions of said parking positions.

1 14. The apparatus of claim 10 wherein parking positions of load-and-unload
2 cups of said object relay devices are arranged in a linear manner.

1 15. The apparatus of claim 10 further comprising a first object transport
2 device to transfer said objects to a first end object carrier of said object carriers, and a
3 second object transport device to transfer said objects from a second end object
4 carrier of said object carriers.

1 16. The apparatus of claim 10 further comprising an additional object relay
2 device positioned to transfer said objects to or from a first end object carrier of said
3 object carriers, said additional object relay device including a load-and-unload cup
4 and a pivoting drive mechanism.

1 17. The apparatus of claim 16 further comprising a first object transport
2 device to transfer said objects to said load-and-unload cup of said additional object
3 relay device, and a second object transport device to transfer said objects from a
4 second end object carrier of said object carriers.

1 18. The apparatus of claim 16 further comprising a first object transport
2 device to transfer said objects to a second end object carrier of said object carriers,

3 and a second object transport device to transfer said objects from said load-and-
4 unload cup of said additional object relay device.

1 19. The apparatus of claim 16 further comprising a second additional object
2 relay device positioned to transfer said objects to a second end object carrier of said
3 object carriers, said second additional object relay device including a load-and-unload
4 cup and a pivoting drive mechanism.

1 20. The apparatus of claim 19 further comprising a first object transport
2 device to transfer said objects to said load-and-unload cup of said additional object
3 relay device, and a second object transport device to transfer said objects from said
4 load-and-unload cup of said second additional object relay device.

1 21. The apparatus of claim 10 wherein said object carriers are arranged such
2 that distances between adjacent object carriers are substantially equivalent.

1 22. The apparatus of claim 10 wherein parking positions of load-and-unload
2 cups of said object relay devices are arranged such that distances between adjacent
3 load-and-unload cups are substantially equivalent when said load-and-unload cups are
4 positioned at said parking positions.

1 23. The apparatus of claim 10 further comprising an object cleaner configured
2 to clean said objects, said object cleaner being positioned such that a longer side of

3 said object cleaner is adjacent to a longer side of an area defined by said polishing
4 surfaces.

1 24. A method for polishing objects, said method comprising:
2 sequentially transferring an object to a plurality of object carriers
3 positioned over a plurality of polishing surfaces using a plurality of load-and-unload
4 cups, including pivoting each of said load-and-unload cups about a pivoting axis to
5 transfer said object between two adjacent object carriers of said object carriers; and
6 sequentially polishing said object on said polishing surfaces using said
7 object carriers.

1 25. The method of claim 24 further comprising transferring said object to a
2 first end object carrier of said object carriers, and transferring said object from a
3 second end object carrier of said object carriers.

1 26. The method of claim 24 further comprising transferring said object to an
2 additional load-and-unload cup positioned adjacent to an end object carrier of said
3 object carriers, and pivoting said additional load-and-unload cup about a second
4 pivoting axis to transfer said object to or from said end object carrier.

1 27. The method of claim 26 further comprising transferring said object to said
2 additional load-and-unload cup, and transferring said object from a second end object
3 carrier of said object carriers.

1 28. The method of claim 26 further comprising transferring said object to a
2 second end object carrier of said object carriers, and transferring said object from said
3 additional load-and-unload cup.

1 29. The method of claim 26 further comprising transferring said object to a
2 second additional load-and-unload cup positioned adjacent to a second end object
3 carrier of said object carriers, and pivoting said second additional load-and-unload
4 cup about a third pivoting axis to transfer said object from said second end object
5 carrier.

1 30. The method of claim 29 further comprising transferring said object to said
2 additional load-and-unload cup, and transferring said object from said second
3 additional load-and-unload cup.

1 31. An apparatus for polishing objects, said apparatus comprising:
2 a first object carrier positioned over a first polishing surface;
3 a second object carrier positioned over a second polishing surface;
4 an object relay device positioned between said first and second object
5 carriers, said object relay device including a load-and-unload cup; and
6 a linear drive mechanism operatively connected to said object relay
7 device, said linear drive mechanism being configured to displace said load-and-
8 unload cup of said object relay device in a substantially linear reciprocating manner

9 to and from said first and second object carriers to transfer said objects from said first
10 object carrier to said second object carrier.

1 32. The apparatus of claim 31 further comprising a first object transport
2 device to transfer said objects to said first object carrier, and a second object transport
3 device to transfer said objects from said second object carrier.

1 33. The apparatus of claim 31 further comprising:
2 a first additional object carrier positioned over said first polishing
3 surface;
4 a second additional object carrier positioned over said second
5 polishing surface; and
6 an additional object relay device positioned between said first and
7 second additional object carriers, said additional object relay device including an
8 additional load-and-unload cup, said additional load-and-unload cup being displaced
9 in a substantially linear reciprocating manner to and from said first and second
10 additional object carriers to transfer said objects from said first additional object
11 carrier to said second additional object carrier.

1 34. The apparatus of claim 33 wherein said additional object relay device is
2 coupled to said object relay device such that said additional load-and-unload cup and
3 said load-and-unload cup are linearly displaced together.

1 35. The apparatus of claim 31 further comprising:
2 a plurality of object carriers positioned over a plurality of polishing
3 surfaces, said plurality of object carriers including said first and second object
4 carriers; and
5 a plurality of object relay devices positioned between said object
6 carriers such that at least one object relay device is positioned between two adjacent
7 object carriers, said object relay devices being operatively connected to said linear
8 drive mechanism to be linearly displaced, each object relay device including a load-
9 and-unload cup, said plurality of object relay devices including said object relay
10 device.

1 36. The apparatus of claim 35 wherein said linear drive mechanism is
2 configured to collectively displace some of said object relay devices in a substantially
3 linear motion.

1 37. The apparatus of claim 35 wherein said linear drive mechanism is
2 configured to individually displace each of said object relay devices in a substantially
3 linear motion.

1 38. The apparatus of claim 35 wherein said object carriers are arranged in a
2 linear manner.

1 39. The apparatus of claim 38 wherein said load-and-unload cups of said
2 object relay devices are further arranged in a linear manner such that said object
3 carriers are positioned to be substantially parallel to said load-and-unload cups.

1 40. The apparatus of claim 39 wherein the distance between adjacent object
2 carriers of said object carriers is substantially equivalent to the distance between load-
3 and-unload cups of adjacent object relay devices.

1 41. The apparatus of claim 35 wherein said load-and-unload cups of said
2 object relay devices are arranged in a linear manner.

1 42. The apparatus of claim 35 further comprising a first object transport
2 device to transfer said objects to a first end object carrier of said object carriers, and a
3 second object transport device to transfer said objects from a second end object
4 carrier of said object carriers.

1 43. The apparatus of claim 35 further comprising an additional object relay
2 device positioned to transfer said objects to or from an end object carrier of said
3 object carriers, said additional object relay device including a load-and-unload cup.

1 44. The apparatus of claim 43 further comprising a first object transport
2 device to transfer said objects to said load-and-unload cup of said additional object

3 relay device, and a second object transport device to transfer said objects from a
4 second end object carrier of said object carriers.

1 45. The apparatus of claim 43 further comprising a first object transport
2 device to transfer said objects to a second end object carrier of said object carriers,
3 and a second object transport device to transfer said objects from said load-and-
4 unload cup of said additional object relay device.

1 46. The apparatus of claim 43 further comprising a second additional object
2 relay device positioned to transfer said objects to a second end object carrier of said
3 object carriers, said second additional object relay device including a load-and-unload
4 cup.

1 47. The apparatus of claim 46 further comprising a first object transport
2 device to transfer said objects to said load-and-unload cup of said additional object
3 relay device, and a second object transport device to transfer said objects from said
4 load-and-unload cup of said second additional object relay device.

1 48. The apparatus of claim 35 wherein said object carriers are arranged such
2 that distances between adjacent object carriers are substantially equivalent.

1 49. The apparatus of claim 35 wherein said load-and-unload cups of said
2 object relay devices are arranged such that distances between adjacent load-and-

3 unload cups are substantially equivalent when said load-and-unload cups are
4 positioned at respective parking positions.

1 50. The apparatus of claim 35 further comprising:
2 a plurality of additional object carriers positioned over said plurality of
3 polishing surfaces such that at least one of said object carriers and at least one of said
4 additional object carriers are positioned over each of said polishing surfaces; and
5 a plurality of additional object relay devices positioned between said
6 additional object carriers such that at least one additional object relay device is
7 positioned between two adjacent additional object carriers, each of said additional
8 object relay devices including an additional load-and-unload cup, each additional
9 load-and-unload cup of said additional object relay devices being displaced in a
10 substantially linear reciprocating manner to transfer said objects between two
11 adjacent additional object carriers.

1 51. The apparatus of claim 50 wherein at least one of said additional object
2 relay devices is coupled to at least one of said object relay devices such that said
3 additional load-and-unload cup of said at least one of said additional object relay
4 devices and said load-and-unload cup of said at least one of said object relay devices
5 are linearly displaced together.

1 52. The apparatus of claim 31 further comprising an object cleaner configured
2 to clean said objects, said object cleaner being positioned such that a longer side of

3 said object cleaner is adjacent to a longer side of an area defined by said first and
4 second polishing surfaces.

1 53. A method for polishing objects, said method comprising:
2 transferring an object to a first object carrier positioned over a first
3 polishing surface;
4 polishing said object on said first polishing surface using said first
5 object carrier;
6 transferring said object from said first object carrier to a second object
7 carrier positioned over a second polishing surface using a load-and-unload cup,
8 including linearly displacing said load-and-unload cup from said first object carrier to
9 said second object carrier; and
10 polishing said object on said second polishing surface using said
11 second object carrier.

1 54. The method of claim 53 further comprising transferring said object to said
2 first object carrier using a first object transport device, and transferring said object
3 from said second object carrier using a second object transport device.

1 55. The method of claim 53 further comprising:
2 transferring a second object to a first additional object carrier
3 positioned over said first polishing surface;

4 polishing said second object on said first polishing surface using said
5 first additional object carrier;
6 transferring said second object from said first additional object carrier
7 to a second additional object carrier positioned over said second polishing surface
8 using an additional load-and-unload cup, including linearly displacing said additional
9 load-and-unload cup from said first additional object carrier to said second additional
10 object carrier; and
11 polishing said second object on said second polishing surface using
12 said second additional object carrier.

1 56. The method of claim 55 wherein said transferring said object from said
2 first object carrier to said second object carrier and said transferring said second
3 object from said first additional object carrier to said second additional object carrier
4 include linearly displacing said load-and-unload cup and said additional load-and-
5 unload cup together.

1 57. The method of claim 53 wherein said first and second object carriers are
2 part of a plurality of object carriers positioned over a plurality of polishing surfaces,
3 and wherein said load-and-unload cup is part of a plurality of load-and-unload cups
4 that can be positioned between said object carriers such that at least one load-and-
5 unload cup is positioned between two adjacent object carriers.

1 58. The method of claim 57 wherein said linearly displacing said load-and-
2 unload cup includes collectively displacing some of said load-and-unload cups in a
3 substantially linear motion.

1 59. The method of claim 57 wherein said linearly displacing said load-and-
2 unload cup includes individually displacing said load-and-unload cups in a
3 substantially linear motion.

1 60. The method of claim 57 further comprising transferring said object to a
2 first object transport device positioned adjacent to a first end object carrier of said
3 object carriers, and transferring said object to a second object transport device
4 positioned adjacent to a second end object carrier of said object carriers.

1 61. The method of claim 57 further comprising transferring said object to an
2 additional load-and-unload cup positioned to adjacent to an end object carrier of said
3 object carriers, and transferring said object to or from said end object carrier using
4 said additional load-and-unload cup.

1 62. The method of claim 61 further comprising transferring said object to said
2 additional load-and-unload cup using a first object transport device, and transferring
3 said object from a second end object carrier of said object carriers using a second
4 object transport device.

1 63. The method of claim 61 further comprising transferring said object to a
2 second end object carrier of said object carriers using a first object transport device,
3 and transferring said object from said additional load-and-unload cup using a second
4 object transport device.

1 64. The method of claim 61 further comprising transferring said object to a
2 second additional load-and-unload cup positioned adjacent to a second end object
3 carrier of said object carriers, and transferring said object from said second end object
4 carrier using said second additional load-and-unload cup.

1 65. The method of claim 64 further comprising transferring said object to said
2 additional load-and-unload cup using a first object transport device, and transferring
3 said object from said second additional load-and-unload cup using a second object
4 transport device.

1 66. The method of claim 57 further comprising:
2 sequentially transferring a second object to a plurality of additional
3 object carriers, said additional object carriers being positioned over said plurality of
4 polishing surfaces such that at least one of said object carriers and at least one of said
5 additional object carriers are positioned over each of said polishing surfaces;
6 sequentially polishing said second object on said polishing surfaces
7 using said additional object carriers;

8 transferring said second object between said additional object carriers
9 using a plurality of additional load-and-unload cups, including linearly displacing
10 said additional load-and-unload cups between said additional object carriers.

1 67. The method of claim 66 wherein said transferring said second object
2 between said additional object carriers includes linearly displacing at least one of said
3 additional load-and-unload cups and at least one of said load-and-unload cups
4 together.

1 68. An apparatus for polishing objects, said apparatus comprising:
2 an object polishing station having an input region to receive said
3 objects and an output region to output said objects, said object polishing station
4 including:
5 a plurality of polishing surfaces;
6 an object transfer station positioned between two adjacent
7 polishing surfaces of said polishing surfaces;
8 a plurality of object carriers, each of said object carriers being
9 configured to secure one of said objects; and
10 at least one drive mechanism operatively connected to at least
11 one of said object carriers, said drive mechanism being configured to displace at least
12 one of said object carriers to and from said object transfer station and one of said two
13 adjacent polishing surfaces; and

14 at least one object transport device to transfer said objects to said input
15 region of said object polishing station and to transfer said objects from said output
16 region of said object polishing station,
17 wherein each of said objects is transferred from said input region to
18 said output region by way of said polishing surfaces of said object polishing station
19 such that each of said objects is polished on said polishing surfaces.

1 69. The apparatus of claim 68 wherein said at least one object transport device
2 is configured to transfer said objects directly to a first end object carrier of said object
3 carriers of said object polishing station, said at least one object transport device being
4 further configured to transfer said objects directly from a second end object carrier of
5 said object carriers.

1 70. The apparatus of claim 68 wherein said drive mechanism of said object
2 polishing station is configured to collectively displace some of said object carriers in
3 a substantially linear motion.

1 71. The apparatus of claim 68 wherein said drive mechanism of said object
2 polishing station is configured to individually displace each of said object carriers in a
3 substantially linear motion.

1 72. The apparatus of claim 68 wherein said object polishing station further
2 comprises a plurality of drive mechanisms, said drive mechanisms including said

3 drive mechanism, each of said drive mechanisms being configured to individually
4 displace each of said object carriers in a pivoting motion.

1 73. The apparatus of claim 68 wherein said object carriers of said object
2 polishing station are arranged in a linear manner.

1 74. The apparatus of claim 73 wherein said object polishing station further
2 comprises a plurality of object transfer stations positioned between said polishing
3 surfaces such that at least one object transfer station is positioned between two
4 adjacent polishing surfaces, said plurality of object transfer stations including said
5 object transfer station, said object transfer stations being arranged in a linear manner
6 such that said object transfer stations are positioned substantially parallel to said
7 object carriers.

1 75. The apparatus of claim 74 wherein the distance between adjacent object
2 carriers of said object polishing station is substantially equivalent to the distance
3 between adjacent object transfer stations of said object polishing station.

1 76. The apparatus of claim 68 wherein said object polishing station further
2 comprises a plurality of object transfer stations positioned between said polishing
3 surfaces such that at least one object transfer station is positioned between two
4 adjacent polishing surfaces, said plurality of object transfer stations including said
5 object transfer station, said object transfer stations being arranged in a linear manner.

1 77. The apparatus of claim 68 wherein said object polishing station comprises
2 an additional object transfer station positioned to transfer said objects to or from an
3 end object carrier of said object carriers.

1 78. The apparatus of claim 77 wherein said at least one transport device is
2 configured to transfer said objects to said additional object transfer station of said
3 object polishing station, said at least one object transport device being further
4 configured to transfer said objects from a second end object carrier of said object
5 carriers.

1 79. The apparatus of claim 78 said at least one object transport device is
2 configured to transfer said objects to a second end object carrier of said object
3 carriers, said at least one object transport device being further configured to transfer
4 said objects from said additional object transfer station.

1 80. The apparatus of claim 77 wherein said object polishing station further
2 comprising a second additional object transfer station positioned to transfer said
3 objects to a second end object carrier of said object carriers.

1 81. The apparatus of claim 80 wherein said at least one object transport device
2 is configured to transfer said objects to said additional object transfer station, said at
3 least one object transport device being further configured to transfer said objects from
4 said second additional object transfer station.

1 82. The apparatus of claim 68 wherein said object carriers of said object
2 polishing station are arranged such that distances between adjacent object carriers are
3 substantially equivalent.

1 83. The apparatus of claim 68 wherein said object polishing station further
2 comprises:
3 a plurality of additional object transfer stations positioned between
4 said polishing surfaces such that at least one of said additional object transfer stations
5 is positioned between two adjacent polishing surfaces; and
6 a plurality of additional object carriers, each of said additional object
7 carriers being displaced in a substantially linear reciprocating manner to transfer said
8 objects between one of said additional object transfer stations and one of said
9 polishing surfaces.

1 84. The apparatus of claim 83 wherein at least one of said additional object
2 carriers is coupled to at least one of said object carriers such that said at least one of
3 said additional object carriers and said at least one of said object carriers are displaced
4 together.

1 85. The apparatus of claim 68 further comprising an object cleaner configured
2 to clean said objects, said object cleaner being positioned such that a longer side of
3 said object cleaner is adjacent to a longer side of an area defined by said polishing
4 surfaces.

1 86. A method for polishing objects, said method comprising:
2 receiving an object at an input region of an object polishing station;
3 sequentially transferring said object to a plurality of polishing surfaces
4 of said object polishing station using a plurality of object carriers of said object
5 polishing station;
6 sequentially polishing said object on said polishing surfaces using said
7 object carriers;
8 transferring said object to an object transfer station of said object
9 polishing station from a first adjacent polishing surface of said polishing surfaces
10 using a first object carrier of said object carriers;
11 transferring said object from said object transfer station to a second
12 adjacent polishing surface of said polishing surfaces using a second object carrier of
13 said object carriers; and
14 outputting said object from an output region of said object polishing
15 station after said object has been polished on said polishing surfaces.

1 87. The method of claim 86 wherein said receiving includes transferring said
2 object directly to a first end object carrier of said object carriers, and wherein said
3 outputting includes transferring said object directly from a second end object carrier
4 of said object carriers.

1 88. The method of claim 86 wherein said transferring said object to said object
2 transfer station and said transferring said object from said object transfer station

3 include collectively displacing said first and second object carriers in a substantially
4 linear motion.

1 89. The method of claim 86 wherein said transferring said object to said object
2 transfer station and said transferring said object from said object transfer station
3 include individually displacing said first and second object carriers in a substantially
4 linear motion.

1 90. The method of claim 86 wherein said transferring said object to said object
2 transfer station and said transferring said object from said object transfer station
3 include individually displacing each of said first and second object carriers in a
4 pivoting motion.

1 91. The method of claim 86 further comprising transferring said object to an
2 additional object transfer station of said object polishing station positioned adjacent to
3 an end object carrier of said object carriers such that said end object carrier can
4 transfer said object to or from said additional object transfer station.

1 92. The method of claim 91 wherein said receiving includes transferring said
2 object directly to said additional object transfer station, and wherein said outputting
3 includes transferring said object directly from a second end object carrier of said
4 object carriers.

1 93. The method of claim 91 wherein said receiving includes transferring said
2 object directly to a second end object carrier of said object carriers, and wherein said
3 outputting includes transferring said object directly from said additional object
4 transfer station.

1 94. The method of claim 91 further comprising transferring said object to a
2 second additional object transfer station of said object polishing station positioned
3 adjacent to a second end object carrier of said object carriers such that said second
4 object carrier can transfer said object to said second additional object transfer station.

1 95. The method of claim 94 wherein said receiving includes transferring said
2 object directly to said additional object transfer station, and wherein said outputting
3 includes transferring said object directly from said second additional object transfer
4 station.

1 96. The method of claim 86 further comprising:
2 sequentially transferring a second object to said polishing surfaces
3 using a plurality of additional object carriers of said object polishing station;
4 sequentially polishing said second object on said polishing surfaces
5 using said additional object carriers;
6 transferring said second object to an additional object transfer station
7 of said object polishing station from said first adjacent polishing surface using a first
8 additional object carrier of said additional object carriers;

9 transferring said second object from said additional object transfer
10 station to said second adjacent polishing surface using a second additional object
11 carrier of said additional object carriers.

1 97. The method of claim 96 wherein said sequentially transferring said second
2 object includes displacing at least one of said additional object carriers and at least
3 one of said object carriers together.

1 98. An apparatus for polishing objects, said apparatus comprising:
2 a first object transport device;
3 a second object transport device; and
4 an object polishing unit positioned between said first and second
5 object transport devices, said object polishing unit comprising:
6 at least one polishing surface; and
7 first and second object carriers positioned over said polishing
8 surface to polish said objects on said polishing surface,
9 wherein each of said objects is transferred from said first object
10 transport device to said second object transport device by way of one of said first and
11 second object carriers.

1 99. The apparatus of claim 98 wherein said object polishing unit further
2 comprises first and second polishing surfaces such that said first object carrier can

3 polish some of said objects on said first polishing surface and said second object
4 carrier can polish some of said object on said second polishing surface.

1 100. The apparatus of claim 98 wherein said object polishing unit further
2 comprises an object relay device positioned between said first and second object
3 transport devices, said object relay device including a load-and-unload cup and a
4 pivoting drive mechanism, said pivoting drive mechanism being configured to pivot
5 said load-and-unload cup about a pivoting axis to transfer said objects to or from said
6 first and second object carriers.

1 101. The apparatus of claim 100 wherein said object polishing unit further
2 comprises an additional object relay device positioned between said object relay
3 device and said second object transport device, said additional object relay device
4 including an additional load-and-unload cup and an additional pivoting drive
5 mechanism, said additional pivoting drive mechanism being configured to pivot said
6 additional load-and-unload cup about a second pivoting axis to transfer said objects
7 from said first and second object carriers.

1 102. The apparatus of claim 98 wherein said object polishing unit further
2 comprises first and second object relay devices positioned between said first and
3 second object transport devices, each of said first and second object relay devices
4 including a load-and-unload cup and a pivoting drive mechanism, said pivoting drive
5 mechanism of said first object relay device being configured to pivot said load-and-

6 unload cup of said first object relay device about a first pivoting axis to transfer some
7 of said objects to or from said first object carrier, said pivoting drive mechanism of
8 said second object relay device being configured to pivot said load-and-unload cup of
9 said second object relay device about a second pivoting axis to transfer some of said
10 objects to or from said second object carrier.

1 103. A method for polishing objects, said method comprising:
2 transferring first and second objects to a first end of an object
3 polishing unit using a first object transport device;
4 polishing said first object on at least one polishing surface of said
5 object polishing unit using a first object carrier of said object polishing unit;
6 polishing said second object on said at least one polishing surface
7 using a second object carrier of said object polishing unit; and
8 transferring said first and second object from a second end of said
9 object polishing unit using a second object transport device, said first and second ends
10 being located on opposite ends of said object polishing unit.

1 104. The method of claim 103 wherein said polishing said first object includes
2 polishing said first object on a first polishing surface of said object polishing unit, and
3 wherein said polishing said second object includes polishing said second object on a
4 second polishing surface of said object polishing unit.

1 105. The method of claim 103 further comprising transferring said first and
2 second objects between said first and second object carriers and one of said first and
3 second object transport devices using a load-and-unload cup of said object polishing
4 unit, including pivoting said load-and-unload cup about a pivoting axis.

1 106. The method of claim 105 further comprising transferring said first and
2 second objects between said first and second object carriers and said second object
3 transport device using an additional load-and-unload cup of said object polishing unit,
4 including pivoting said additional load-and-unload cup about a second pivoting axis.

1 107. The method of claim 103 further comprising transferring said first object
2 between said first object carrier and one of said first and second object transport
3 devices using a first load-and-unload cup of said object polishing unit, including
4 pivoting said first load-and-unload cup about a first pivoting axis, and transferring
5 said second object between said second object carrier and one of said first and second
6 object transport devices using a second load-and-unload cup of said object polishing
7 unit, including pivoting said second load-and-unload cup about a second pivoting
8 axis.

1 108. An object relay device for loading and unloading an object, said wafer
2 relay device cup device comprising:
3 a load-and-unload cup;

4 an arm operatively connected to said load-and-unload cup to laterally
5 move said load-and-unload cup; and
6 a cup ascending-and-descending mechanism operatively connected to
7 said load-and-unload cup and said arm, said cup ascending-and-descending
8 mechanism being configured to raise and lower said load-and-unload cup with respect
9 to said arm.

1 109. The object relay device of claim 108 wherein said load-and-unload cup
2 comprises a central bladder connected to a surface of said load-and-unload cup, said
3 central bladder being configured to be inflated and deflated pneumatically in a
4 vertical direction with respect said surface, said central bladder being configured to
5 support said object to raise said object when said central bladder is inflated.

1 110. The object relay device of claim 108 further comprising an air cushioning
2 mechanism operatively coupled to said load-and-unload cup to absorb a vertical
3 action force.

1 111. The object relay device of claim 108 wherein said load-and-unload cup
2 comprises:
3 an object supporting structure;
4 a plurality of bladders coupled to said object supporting structure, each
5 of said bladders being configured to be inflated and deflated pneumatically in a
6 vertical direction with respect to a surface of said object supporting structure; and

7 a plurality of aligners coupled to said plurality of bladders such that at
8 least one bladder is coupled to each aligner, each of said aligners comprising a first
9 horizontal portion to support said object and a second horizontal portion to contact a
10 bottom portion of an object carrier when said bladders are inflated.

1 112. The object relay device of claim 111 wherein said load-and-unload cup
2 further comprises a plurality of second bladders coupled to said object supporting
3 structure and said aligners, each of said second bladders being configured to be
4 inflated and deflated pneumatically in a horizontal direction with respect to said
5 surface of said object supporting structure.

1 113. The load-and-unload cup device of claim 112 wherein each of said
2 aligners further comprises a first vertical portion to move an edge of said object
3 inward when said second bladders are inflated and a second vertical portion to contact
4 an outer surface of said object carrier when said second bladders are inflated.

IX. Evidence Appendix

NONE

X. Related Proceedings Appendix

NONE